

## CHAPTER I

### INTRODUCTION



*Staphylococcus aureus* is pathogenic bacteria that cause mild diseases such as food poisoning to life threatening such as toxic shock syndrome. This bacteria is the major cause of all pus and complication of many types of wound such as burn wound.

(1)

Almost all *S. aureus* can produce beta-lactamase enzyme that destroy beta-lactam antibiotics such as penicillin and cephalosporin, thus the treatment did not work. Methicillin, the beta-lactamase resistant penicillin, was firstly introduced to use in clinical practice in 1959. Soon after the introduction of methicillin, the *S. aureus* resistant to methicillin was detected in England, and this strain was called methicillin-resistant *S. aureus* (MRSA). However, this strain did not caused the serious infection, until 1970, the different MRSA strain was detected in Australia. Its properties were different from the classic MRSA, such that the new isolate resisted to other groups of antibiotics besides beta-lactam. Then MRSA have widely spread (2), and become important infectious problem. In present day, there are many reports of MRSA outbreak all over the world. (3-7)

Linnemann *et. al.* (1982) (8) proposed that when the rate of MRSA infection in all infectious disease was up to 5-10% , it would indicate that there was MRSA outbreak in that hospital. In Thailand, there are many incidences of MRSA infection in governmental hospitals. Vorachit (1988) (9) studied the outbreaks of MRSA infection at Ramathibodi hospital during 1984 to 1988, and showed that the incidence of MRSA infection increased from 5% in 1984 to 15% in 1987. Especially in 1988, there was an MRSA outbreak in medicine, surgery and pediatric unit. Danchaivijitr *et al.* (1995) (10) studied the incidence of MRSA infection at the burn unit, Siriraj hospital, and found that there were 14 out of 29 patients at burn unit (48.3%) who were infected

with MRSA. These data indicated that there was a high prevalence of MRSA in such unit. The cause of the problem maybe the improper use of beta-lactam antibiotics, and incomplete control of MRSA infection because of the lack of epidemiological data on MRSA, especially, the source and the transmission route of MRSA.

There are many reports about the source of *S. aureus* and MRSA. (11-15) These reports stated that the living sources (e.g.: medical personnel and patients) were more important than non-living sources (e.g.: environment and tools). The outbreak was spread within the hospital, and was frequently happened in critical care unit. (13-15) Most reports suggested that MRSA transmission should be from medical personnel to patients , or from patients to patient. However, there was no confirmation that MRSA detected in each outbreak was the same strain.

There are many typing methods for the study of the epidemiology of MRSA included the use of antimicrobial susceptibility pattern (antibiogram) , phage typing , and molecular typing such as plasmid profile, ribotyping, and analysis of restricted fragments of chromosomal DNA by pulsed-field gel electrophoresis (PFGE) , which is the best typing method in the present day.(16-18)

Eventhough, there were some reports on the prevalence of MRSA in government hospital in Thailand, but there were very few studies on the epidemiology especially on molecular typing. In order to find the source and to the trace for the route of transmission of this pathogenic bacteria in the burn unit at Siriraj Hospital, this study has been performed.